

**WHAT IS CLAIMED IS:**

- 1 1. A method of operating in a CSMA network comprising:  
 2 exchanging messages by a device with a second device over a medium using a CSMA  
 3 contention-oriented service to establish a session of periodic contention-free intervals within the  
 4 CSMA contention-oriented service for use by the device and second device for contention-free  
 5 traffic on the medium; and  
 6 determining by the device when transmissions can occur on the medium during the  
 7 contention-free intervals based on the exchanged messages.
- 1 2. The method of claim 1, wherein the device is a master device and the second device is a  
 2 slave device.
- 1 3. The method of claim 2, wherein the contention-free traffic comprises down-stream  
 2 frames by the master device and up-stream frames by the slave device, and wherein determining  
 3 comprises:  
 4 polling by the master device of the slave device in the down-stream frames and receiving  
 5 upstream frames from the slave in response thereto.
- 1 4. The method of claim 1, wherein the device and the second device each includes a MAC  
 2 unit coupled to a host, further comprising:  
 3 responsive to the connection control messages exchange, receiving a set connection  
 4 message from the host at the MAC unit, the set connection message including a connection  
 5 number assigned to a connection between the device and the second device, a master flag for  
 6 indicating if the device is the master device and a control flag for indicating that master control is  
 7 to be passed and the direction in which the master control is to be passed.
- 1 5. The method of claim 4, wherein each frame in the contention-free traffic includes a  
 2 contention control indicator for indicating contention free status, a priority field including a  
 3 priority of the frame, a connection number field for identifying the connection number received  
 4 in the set connection message, as well as source and destination address fields.

1 6. The method of claim 5, wherein each frame includes frame control information  
 2 observable by substantially all devices in the CSMA network, and wherein the contention control  
 3 indicator and the priority are included in the frame control information.

1 7. The method of claim 5, wherein the device is a master device and the second device is a  
 2 slave device, and wherein the contention-free traffic includes a downstream frame from the  
 3 ~~master device and an upstream frame from the slave device.~~

1 8. The method of claim 7, wherein the downstream frame triggers transmission of an  
 2 upstream frame from the slave if the connection number matches the connection number in the  
 3 set connection message, the contention control indicator is set to indicate contention-free status,  
 4 the priority field is set to a highest priority and the source address matches the address of the  
 5 master device.

1 9. The method of claim 8, further comprising:  
 2 preventing transmission of an upstream frame following the downstream frame by setting  
 3 the connection number to a number other than the assigned connection number.

1 10. The method of claim 9, further comprising:  
 2 sending another downstream frame following the downstream.

1 11. The method of claim 7, wherein the set connection message further includes a source  
 2 address frame size specifying the size of the frame to be delivered, further comprising:  
 3 using a transmit timer based on the source address frame size to determine when a  
 4 queued frame is to be transmitted when no frame is received by the master device from the slave  
 5 device due to a failure of an upstream frame or downstream frame.

1 12. The method of claim 4, wherein the set connection message further includes a transmit  
 2 frame size specifying an average frame size, further comprising:

3 using the transmit frame size to determine the size of a dummy frame to be transmitted  
4 when transmission of a frame is to occur and a frame is not queued for transmission.

1 13. The method of claim 4, wherein the device is a slave device and the second device is a  
2 master device and the contention-free traffic includes a downstream frame by the master device  
3 and an upstream frame by the slave device, and wherein the set connection message further  
4 includes a lifetime timer value for indicating when a queued frame is to be discarded when the  
5 downstream frame has not been received from the master device.

1 14. The method of claim 4, wherein the device is a master device, further comprising:  
2 passing master control from the master device to the second device when the master flag  
3 and the control flag are set.

1 15. The method of claim 4, wherein the second device is a master, further comprising:  
2 receiving master control from the master device when the master flag and the control flag are set.

1 16. The method of claim 5, wherein the device is a slave device and wherein the connection  
2 control messages indicate that the slave device is to transmit the last frame in the contention-free  
3 interval, further comprising:  
4 responsive to the exchange and triggered to transmit by a downstream frame, transmitting  
5 an upstream frame with the contention control indicator having a value for indicating that the  
6 contention-free interval is terminated.

1 17. The method of claim 1, wherein the medium is a power line.

1 18. The method of claim 14, wherein the master device and the second device to whom the  
2 master control is passed have different network encryption keys and wherein passing comprises:  
3 passing the master control in an unencrypted downstream frame during one of the contention-  
4 free intervals.

1 19. The method of claim 1, wherein the device is a master device, further comprising:  
2 exchanging messages between the device and a device in a different logical network for  
3 arranging to pass control of the session to the device in the different logical network.

1 20. The method of claim 1, wherein frames in the contention-free traffic include frame  
2 control information that is heard by other devices and a payload that is not likely to be heard by  
3 the other devices.

1 21. The method of claim 20, wherein the frame control information includes a channel map  
2 index associated with channel map information to be applied to the payload for decoding and  
3 demodulation.

1 22. A computer program residing on a computer-readable medium for operating in a  
2 CSMA network, the computer program comprising instructions causing a computer to:  
3 exchange messages by a device with a second device over a medium using a CSMA  
4 contention-oriented service to establish a session of periodic contention-free intervals within  
5 the CSMA contention-oriented service for use by the device and second device for  
6 contention-free traffic on the medium; and  
7 determine by the device when transmissions can occur on the medium during the  
8 contention-free intervals based on the exchanged messages..